enhancement practices. The CDFG is also investigating the feasibility of maintaining aspen stands by suppressing aspen rust and encroachment of conifers. The following management goals were identified during the initial acquisition process and were summarized in the Heenan Lake Wildlife Area Management Plan of 1990. These goals are still the basis for establishing current management practices at Heenan Lake:

1) Maintain Heenan Lake and adjacent riparian habitat in a healthy manner to insure growth of Lahontan cutthroat trout into healthy brood stock.
2) Retain and enhance the wide diversity of existing vegetative communities with emphasis on riparian, meadow habitats, and preventing juniper encroachment in aspen stands.
3) Monitor representative species to indicate health of habitat types on the wildlife area, and enhance habitats for sage grouse, and maintain populations of bald eagles.
4) To provide public use recreational activities that do not conflict with the primary objectives of the acquisition.
5) To monitor the area for building, dam, and fence maintenance; management activities and their effectiveness.
6) Maintain the public fishing and hunting programs.

II. PROPERTY DESCRIPTION

Description

The HLWA consists of Heenan Lake, Heenan Creek, and surrounding lands totaling 1,652 acres (**Figure 1**) (**Photo 1**). Heenan Lake covers 130 surface acres and has a capacity of 3,000 acre feet. The spillway elevation is 7,076 feet while the elevation of the wildlife area rises to slightly over 8,000 feet. Historically, the property was used primarily for grazing. Historic cattle use has been moderate to heavy. Minor erosion (head-cutting) is evident in the meadow at the head of Heenan Creek and in the meadow on the southern end of the HLWA.

The HLWA is located about seven miles southeast of Markleeville, California in eastern Alpine County. It is in a mountainous setting on the west side of Monitor Pass and may be reached via State Highway 89 (**Figure 1** and **Figure 2**). The property includes all, or portions of, Sections 1, 2, 3, 10 and 11 in Township 9 north, Range 21 east of the Heenan Lake U.S. Geological Survey quadrangle.

The ridges are covered with shrubs such as sagebrush (*Artemisia tridentata*), bitterbrush (*Purshia tridentata*), gooseberry (*Ribes* sp.), western blueberry (*Vaccinium occidentale*), western juniper (*Juniperus occidentalis*), and mountain mahogany (*Cercocarpus ledifolius*). East slopes contain the conifers, Jeffery pine (*Pinus jeffreyi*) and white fir (*Abies concolor*). Aspens (*Populus tremuloides*) occur on the damp slopes in areas across the HLWA. Willows (*Salix* sp.), aspen, grasses, and forbs are found along the drainages of Heenan Creek. Lower elevations, south of Heenan Lake, are dominated by sagebrush, grasses, and forbs.

Figure 1

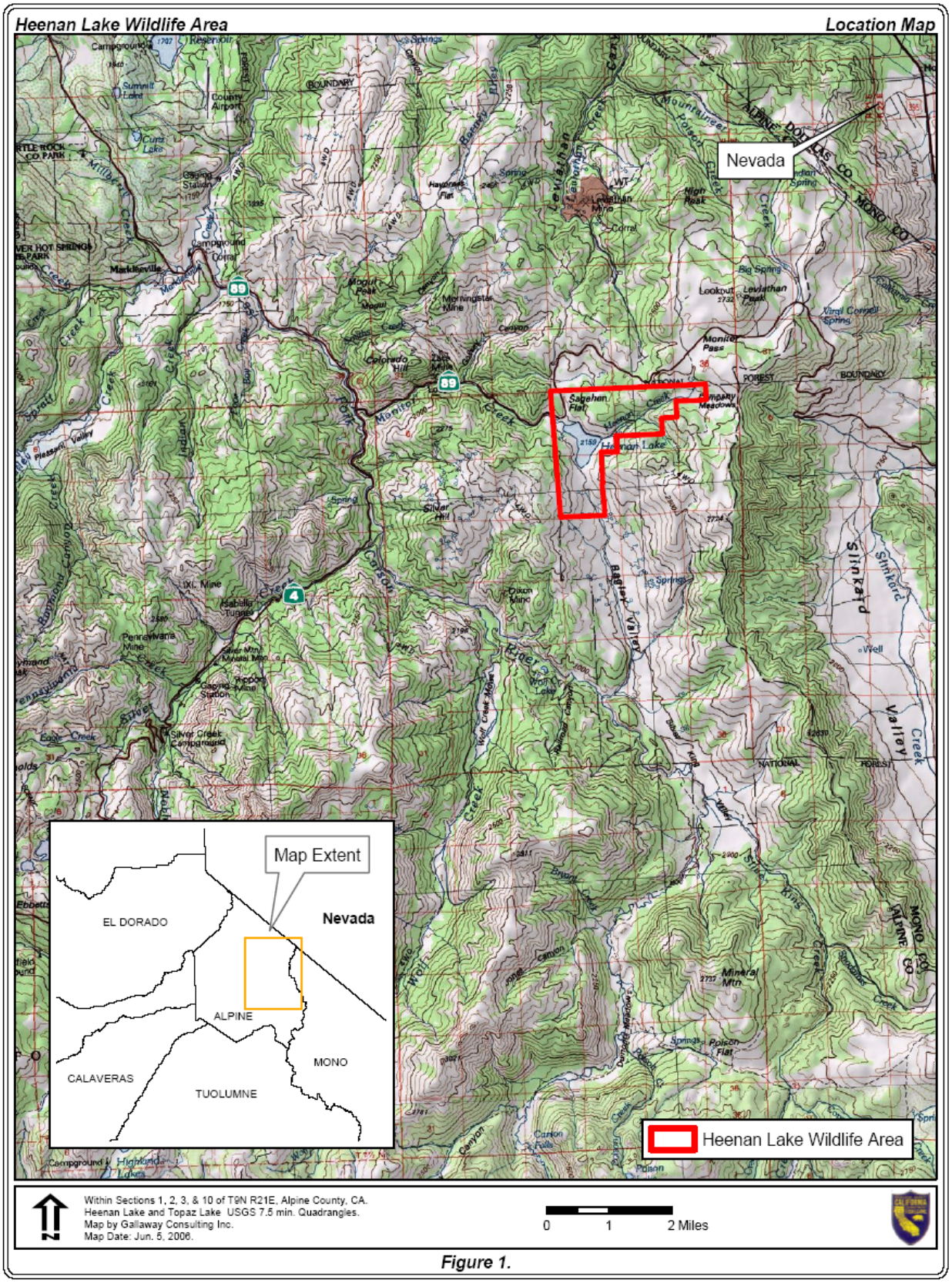


Figure 1.

Figure 2

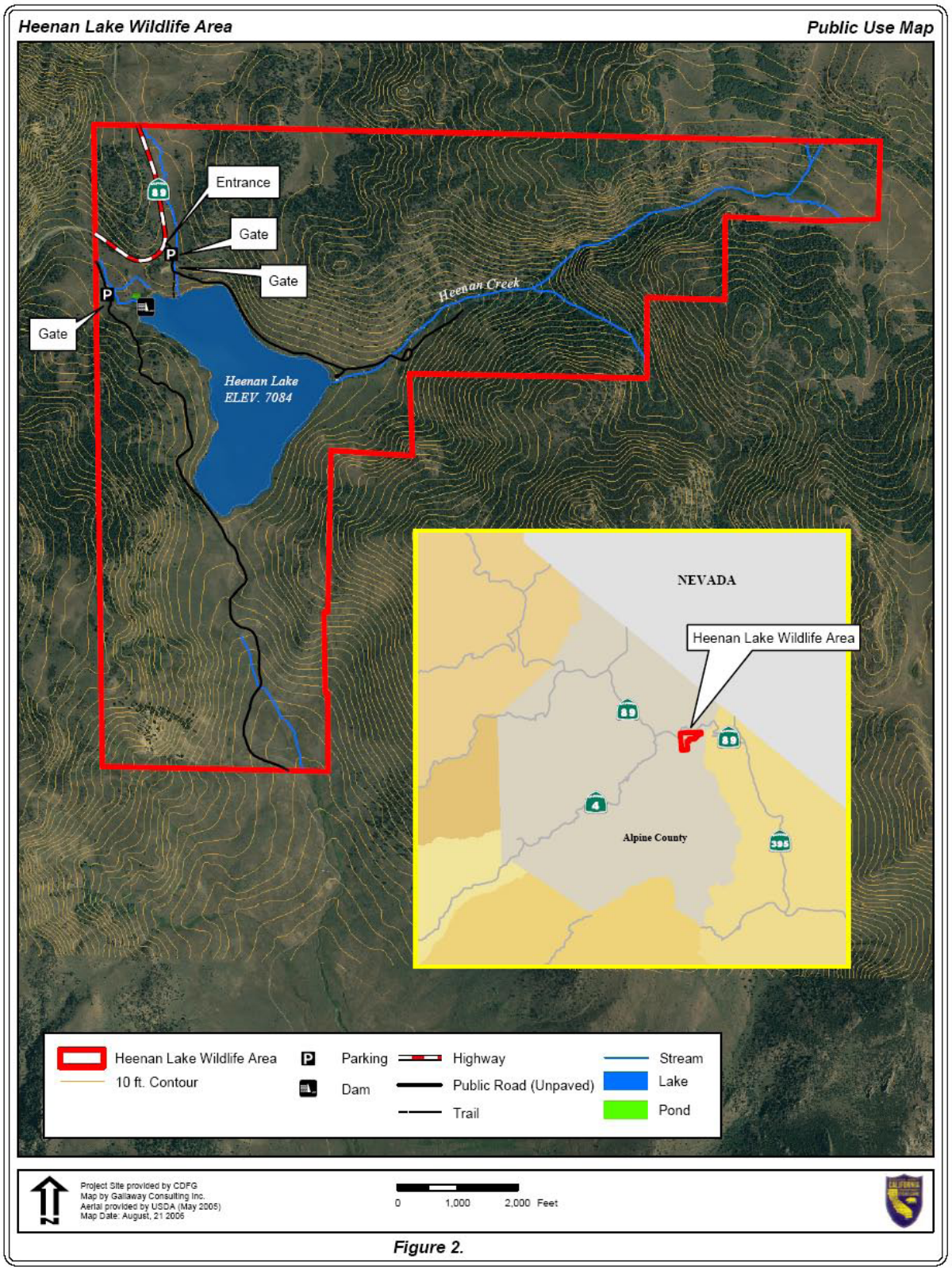


Figure 2.

Photo 1 Heenan Lake and surrounding landscape.

Fish and Wildlife

Heenan Lake contains Lahontan cutthroat trout brood fish used for egg production. Eggs provide fingerling and yearling trout for maintenance stocking in California and Nevada. Heenan Lake supports a popular catch and release fishery for trophy-sized Lahontan cutthroat trout. Wildlife that occur in the meadows and adjacent ridges include mule deer (*Odocoileus hemionus*), belding ground squirrel (*Citellus beldingi*), red-tailed hawk (*Buteo jamaicensis*), ravens (*Corvus corax*), Clarks nutcrackers (*Nucifraga columbiana*), robins (*turdus migratorius*), coyotes (*Canis latrans*), black bear (*Ursus americanus*), and marmots (*Marmota flaviventris*). Blue grouse (*Dendragapus obscurus*) can be heard booming in the spring and golden eagles (*Aquila chrysaetos*) have been observed during the summer and fall. Bald eagles have also been observed during the spring, summer, and fall.

Land Use History

Under private ownership, the area was primarily grazed for livestock. The water in Heenan Lake has been used to irrigate downstream lands in Nevada. An old siphon system allowed for irrigation of pasture and meadows on private lands to the south. The system is not currently operational.

Public access was limited but some recreation use was allowed, with landowner permission for activities such as hunting, camping, and access to fishing areas in Bagley Valley to the south.

Under CDFG ownership, walk-in use is allowed for hiking, hunting during open seasons, and a catch-and-release fishing program, in the Lake, during September and October. All unauthorized motorized vehicle use is prohibited.

When the property was purchased by CDFG, the previous owners retained several provisions in the deed. These provisions applied to livestock management, use of water and timber rights. An easement allowed full use of existing corrals, related structures, and the movement of livestock through the property over existing roads, but did not include grazing rights. The seller disclaimed all responsibility for trespass livestock. Water rights to the lake were retained by the previous owner; however, a minimum pool of water (500-acre feet) must be maintained in the Lake. Since that time, CDFG has acquired more water rights to Heenan Lake to assure wintertime survival of the Lahontan cutthroat trout. A total of 2,324 acre feet, 78.8% of existing water rights, now belong to CDFG. Timber harvest rights were held by American Forest Products Co. (currently Georgia-Pacific), but were purchased by CDFG several years after purchase of the property.

Cultural Features

There are 19 cultural resource locations for which records have been submitted and site numbers assigned. These 19 cultural resources include 7 prehistoric sites, one dual component site, containing both prehistoric and historic cultural materials, 8 historic sites, and 3 Isolates (non-sites) (**Photo 3** and **4**). Sixteen additional sites have been reported by Summit Envirosolutions, Inc. to the Information Center, but no site records have yet been submitted and precise site locations are unknown.

Brief Synopsis, Cultural Context

Prehistory: Native American occupation of the project area and region likely dates from 10,000 or more years ago (Elston et al. 1994), culminating in use of the area by the Washoe. Other north-central Sierran groups, including the Nisenan and Northern Sierra Miwok, may have visited the project area. A series of archaeological phases have been defined that characterize patterns of technological and cultural change that occurred during this long interval.

Initial occupation of the north-central Sierra region is defined by the appearance of the Tahoe Reach Phase and the following Spooner Phase (Early Archaic). However, sites of this age (circa. 7500 BP to 4000 BP) containing relevant archaeological “diagnostics” are rare in the north-central Sierra, perhaps because of limited use of higher elevation regions during this period.

Photo 3. Cultural site at the HLWA.

Photo 4. Cultural site at the HLWA.

The Middle Archaic (circa. 4000 BP to 2500 BP) in the north-central Sierra is often equated with the Martis, and involved utilization of higher elevation zones more intensively than previous occupants. As such, Basalt was intensively utilized, while obsidian use waned. The Late Archaic through Protohistoric and Historic Contact period (circa. 2500 BP to historic contact) is defined archaeologically as Kings Beach and Washoe-Late Kings Beach, and is marked by increasing populations, smaller and lighter projectile points, and possible increased reliance on smaller game and floral resources (Elston 1986:147-149).

Archaeological studies relevant to this long prehistoric sequence are detailed on pp. 15 - 21 of the Summit Envirosolutions report included in **Attachment C** *Class I Archaeological Survey, Heenan lake Wildlife Management Plan Study Area*. Maps or descriptions of the locations of archaeological sites, included in **Attachment C,** are for in-house use only, and are not for public viewing.

Ethnography: The project area is located within territory, which, at the time of initial contact with European-American culture (*circa* AD 1830's), was occupied and claimed by the Washoe (Downs 1966). There was possible limited use by neighboring groups including the Nisenan, the Northern Sierra Miwok, and the Northern Paiute. However, strong Washoe ethnographic ties to the project area, and numerous Washoe place names for the specific area, suggest that use by these neighboring groups may have been quite limited.

Heenan Lake was known to the Washoe as *Who-sa lee-watak* (or "Squirrel Lake"), due to an abundance of small squirrels known to inhabit the marshy area prior to construction of the lake. Surrounding areas and lands throughout Bagley Valley, referred to by the Washoe as *su gil* (for the plant mule's ears) further establishes Washoe ties to this land. Practicing a seasonally transhumant subsistence and settlement pattern, the Washoe moved from one area or elevation zone to another to harvest plants, fish, and hunt game. Their geographical range was extensive, with the largest aggregations of people occurring at winter camps and at good fishing locations, particularly within the lower valleys along the east margin of the Sierra Nevada. Some high elevation settlements were occupied year round, such as at Donner Lake. These appear to be linked with high-quality fisheries, especially the Truckee River.

A detailed summary of Washoe social organization, settlement and subsistence patterns, technology and material culture, and inter-group relations relevant to the Heenan Lake and Bagley Valley areas is presented on pp. 21 - 26 of the attached Summit Envirosolutions report (**Attachment C**).

Resource Considerations, Native American Sites: Based on the test excavation report by Summit Envirosolutions and previous studies and site records, a wide range of Native American site and feature types are present within the project area and surrounding vicinities. The site and feature types already documented, or considered likely to be present, within the study area include:

- Relatively large village sites located along the margins of streams or at other natural surface water sources, particularly at confluences of streams.
- Surface scatters of lithic artifacts and debitage without evidence of buried cultural deposits, resulting from short-term occupation and/or specialized/seasonal economic activities.
- Bedrock milling features.
- Quarries utilized to extract tool stone, undertake initial reduction of the quarried raw material, and manufacture finished lithic tools.
- Possible surface features such as short rock wall segments, rock ("sleeping") circles, and other feature types.
- Isolated finds of aboriginal artifacts and waste flakes.

Historic Context: Recorded history in the project area may have begun with European American exploration parties of the 1820s through 1840s. Jedediah Smith, with a party of trappers, crossed the Sierra Nevada at Ebbetts Pass and traveled along the East Fork of the Carson River in May of 1826 (Farquhar 1965). The Walker-Leonard trapping party of 1833 and the Bartleson-Bidwell emigrant party of 1841 may also have traversed Alpine County. Several communicable diseases were introduced to the region during these early visits, with devastating consequences for the Native inhabitants (see, for example, Work 1945; Cook 1976).

Additional major incursion by European American populations followed, with relevant historic themes including early transportation (which is particularly relevant to the present project area at Heenan Lake), land grant settlements, mining, logging, and ranching.

Resource Considerations, Historic Sites and Features: A detailed summary of the area's major historic themes is presented on pp. 26 - 33 of the attached Summit Envirosolutions report (**Attachment C**). The discussion of early transportation is of particular relevance to the Heenan Lake and Bagley Valley areas. Based on Summit Envirosolutions' discussion of historic context, combined with previous studies and site records, a wide range of historic site and feature types are present within the project area and the general vicinity, including:

- Historic roads and associated features, including SR 89.
- Water distribution systems, including small and large ditch systems, improved and tapped springs, check dams and other features along natural drainages.
- Historic homesteads and ranch features, including possible refuse disposal areas, privy pits, etc. Remnants of "Bagley's Ranch" are also present within the vicinity, with the core features of the original ranch built near the headwaters of Monitor Creek and thus near the project area. Also potentially present are salt licks and other small structures associated with the Dangberg Land and Livestock Company who purchase the land at and around "Grass Lake", now known as Heenan Lake. Dangberg constructed the lake and dam in 1926, and erected the structure in the mid- to late-1940's in order to deliver water south to Bagley Valley. The dam and

Heenan Lake itself, directly associated structures features, and features linked with delivery of Heenan Lake water to Bagley Valley are all historic.
- Blazed trees with Basque inscriptions, names and dates.
- Quarries.
- Historic telegraph line features.
- Mining-related features.
- Historic logging features, including high-cut stumps, landings, skid trails.

Relationship to Adjacent Lands

Adjacent property owners include Toiyabe National Forest (TNF) to the north and west, Bureau of Land Management (BLM) to the east and federal lands to the south.

Grazing allotments exist on the adjacent federal lands. While the former owner did not retain grazing rights, the CDFG is responsible for controlling trespass cattle. The CDFG constructed a two-strand 12-volt electric perimeter fence operated by several solar units. Trespass still occurs, as adequate staffing is not available for proper fence maintenance. The electric fence has not been as effective as originally anticipated. Livestock, bears, and broken tree limbs have, at different times, hit the wire, pulled the insulators from the posts and shorted the electric fence. The northern portion of the property has an old, common-boundary barbed wire fence with TNF lands. The fence, which is the responsibility of CDFG to maintain, is in poor shape and in need of repair. A new let down fence has been proposed as a replacement. The USFWS and CDFG are cooperating on fencing current cattle trespass locations to prevent future trespass problems.

A new egg taking station was constructed at the mouth of Heenan Creek. However, while surveying property lines in preparation of fence building, the building was discovered to be outside the HLWA boundary, on BLM lands. Two fragmented pieces were exchanged with BLM in November 2000, for two equal pieces of property contiguous with the rest of the HLWA. This land exchange provided the area containing the new egg take station.

Access

Two roads lead into the HLWA from Highway 89. The west side road parallels Heenan Lake and continues south onto USFS lands in Bagley Valley and Vaquero Cow Camp, a distance of approximately seven miles. A second road enters the property off Highway 89 near the north shoreline of the lake. This road provides access to the egg taking station and corrals.

Public access is limited to foot or horseback. During the winter season an occasional cross country skier or snowshoer crosses the property to gain access to adjacent Federal Lands.

Soils

The soil series and soil complexes on-site were derived from colluvium, alluvium, and residuum from volcanic parent materials andesite, tuff, and tuff-brecca that occur on

mountains (**Figure 3**). The soils in the area are well-drained except for Wetbag and Vermdig series, and are deep except for the shallow Gerdog, and Loope series. Official soil series descriptions can be found in **Attachment D**.

Climate

The climate of the HLWA consists of Lower Boreal (Dsb), and Upper Boreal (Dsc). These climates, based on the Köppen classification system, are described as having pleasant dry summers with cold snowy winters and cool dry summers, with occasional thunderstorms, and very cold snowy winters respectively. See **Charts 1, 2,** and **3** for monthly temperature, monthly precipitation, and seasonal precipitation data.

Geology

During the Mesozoic Era a chain of volcanoes formed along the present location of the Sierra Nevada Mountain Range (USGS 2004). These volcanoes formed as the Pacific Plate was subducted under the North American Plate (USGS 2004). Molten rock pushed through the older Paleozoic rock. Some of it erupted at the surface, but most stayed below the Earth's surface as large plutons of granite (USGS 2004). The volcanoes were eventually weathered away to low rolling mountains of just a few thousand feet. The granite plutons, once buried, were exposed at the Earth's surface by the late Cretaceous (USGS 2004).

The fault block features to the east of the Sierra Nevada range began to form due to increased tension of the continental crust in that area less than 20 million years ago during the Miocene Epoch (USGS 2004). This tension stretched and broke the Earth's crust, forming the north-south oriented fault block mountains of the Great Basin and Range region (USGS 2004).

The Sierra Nevada began to rise and tilt, which created the sharp contrast in elevation on the eastern side of the Sierra Nevada Range around 5 million years ago (USGS 2004). During this time, the Earth began to cool and Pleistocene glaciers carved the dramatic hanging valleys, sheer walls and waterfalls characteristic of the Sierra Nevada region we know today (USGS 2004).

Figure 3

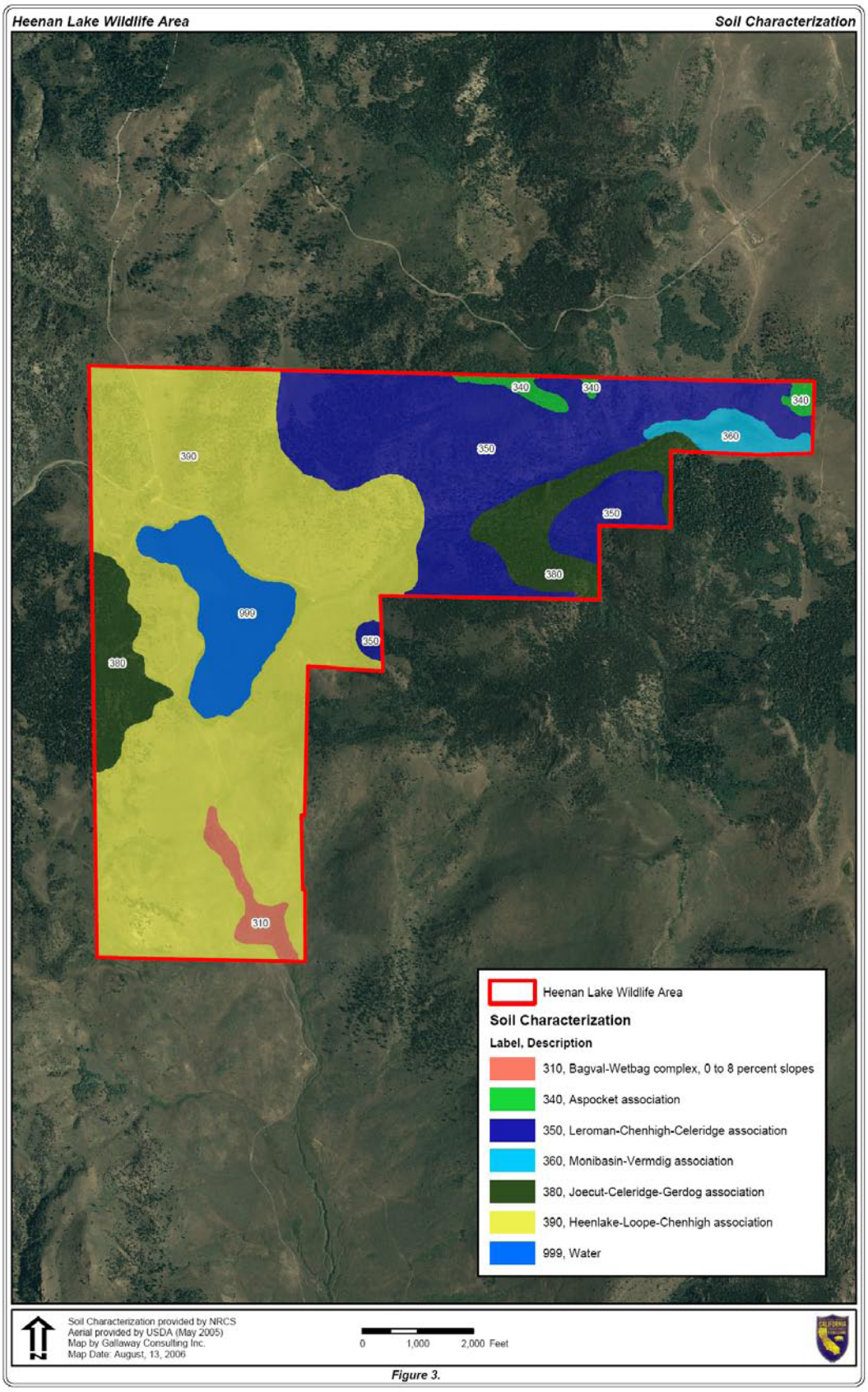


Figure 3.

Chart 1 Monthly Temperature data for the HLWA*

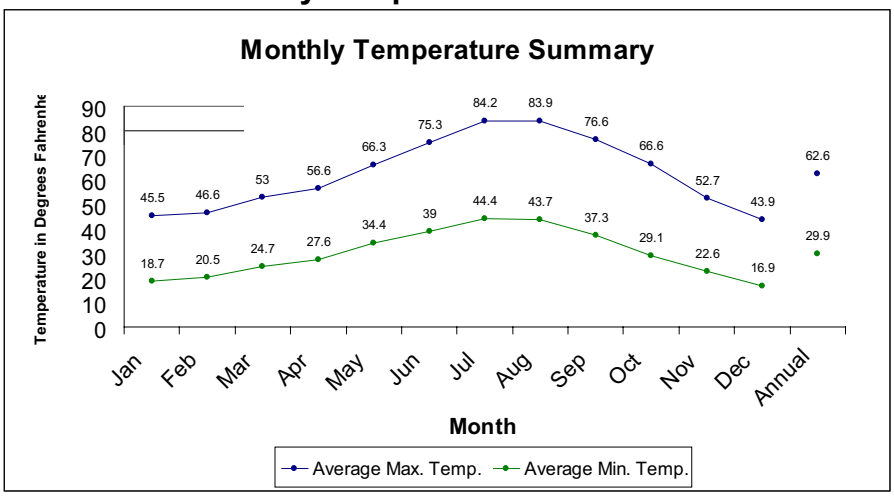


Chart 2 Monthly Precipitation Data for the HLWA*

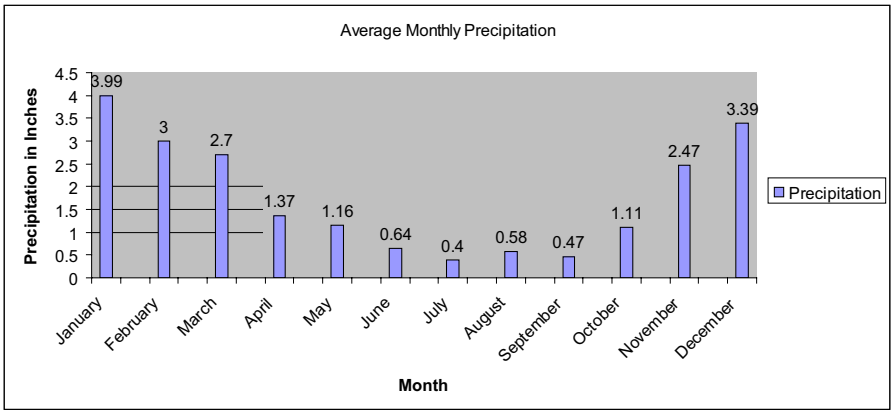
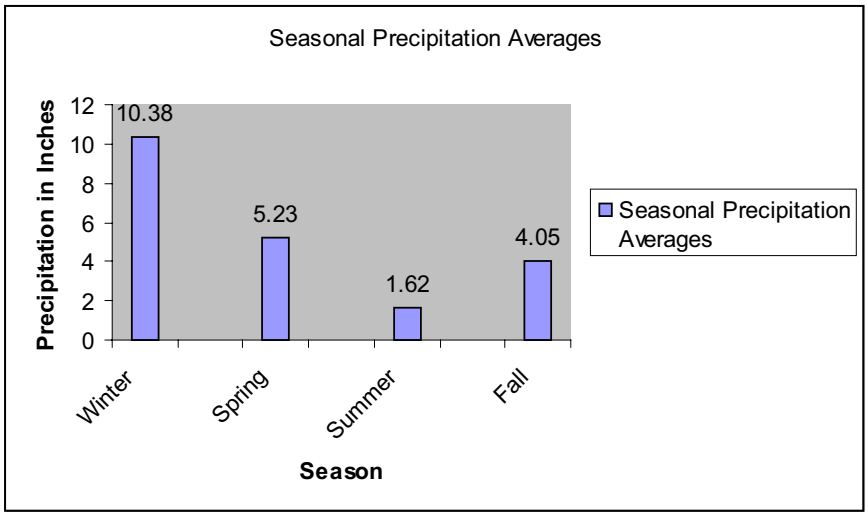


Chart 3 Seasonal Precipitation Averages for the HLWA*



* Data retrieved from the Western Regional Climate Center for Markleeville CA.

The formations found within the HLWA are the Relief Peak Formation, Quartz Latite Porphyry flows, and Leviathan Peak Andesite (John et al. 1981). The Relief Peak Formation is an andesite and basaltic flow formation containing flow breccias, lahars, intrusive rocks, and volcanic sediments (John et al. 1981). The Quartz Latite Porhpyry flows, found to the south of the eastern portion, are "intrusive onto Relief Peak Formation and overlain by the Leviathan Peak Andesite" (John et al. 1981). Levithan Peak Andesite, a flow formation containing "platy-jointed, flow-banded porphyritic hornblende andesite flows and shallow intrusions," is found on the northern border of the project area (John et al. 1981).

Hydrology

Heenan Lake dam was constructed in 1924 by the Dangberg Family (Bryson 2000). Heenan Lake collects snowmelt and spring water from uplands to the north and east (Bryson 2000). Heenan Creek makes up the major drainage of the eastern portion of the HLWA property, and an un-named drainage flows into Heenan Lake from the north (**Figure 4**). A derelict diversion ditch conveys runoff to Heenan Lake from an unnamed tributary to Monitor Creek, north of Sagehen Flat. During high water years, Heenan Lake also spills water into Monitor Creek, which flows down-slope along State Route 89. Heenan Lake covers 130 surface acres and has a capacity of 3,000 acre-feet. Heenan Creek water temperature can fluctuate greatly during the course of a day because of the small, shallow nature of the creek (Bryson 2000). Summer temperatures typically range from 35° F in the morning to 60° F in the afternoon (Bryson 2000).

III. HABITAT AND SPECIES DESCRIPTIONS

The unique climate and topography of the area supports a number of plant communities, which, consequently, satisfy the habitat needs of a vast range of plant and animal species.

The HLWA provides habitat for several species including the Lahontan cutthroat trout, several species of ducks, raptors including bald eagles and golden eagles, passerines, and mammals including coyotes, mule deer, black bears, and pika (*Ochonta princeps*).

Vegetation Communities, Habitats and Plant Species

Vegetation surveys and habitat typing and mapping were conducted by CDFG staff using the CWHR habitat classification system. Eleven habitat types were mapped within the HLWA. They include: Annual Grassland, Aspen, Bitter Brush, Jeffery Pine, Juniper, Lacustrine, Montane Chaparral, Montane Riparian, Sage Brush, Wet Meadow, and Urban.

Heenan Lake provides the open-water lacustrine habitat that occurs on-site. The Lake is 130 surface acres, made up of open-water and littoral habitat. The 51 acres of montane riparian habitat within the HLWA occur as a long strip along Heenan creek, which flows from the northeast into Heenan Lake (**Figure 4**). Wet Meadow habitat can be found along the spillway of Heenan Lake, as well as a small patch to the northeast,